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EXAMINER
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PETERSON, CHRISTOPHER K

ART UNIT	PAPER NUMBER
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2622

NOTIFICATION DATE	DELIVERY MODE
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09/01/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/753,507	<b>Applicant(s)</b> SILVERSTEIN ET AL.	
	<b>Examiner</b> CHRISTOPHER K. PETERSON	<b>Art Unit</b> 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 May 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Reopening of Prosecution After Appeal Brief***

1. In view of the Appeal Brief filed on 5/26/2009, PROSECUTION IS HEREBY REOPENED. A new grounds of rejection set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1, 12, 25, and 31 have been considered but are moot in view of the new ground(s) of rejection.

### ***Specification***

3. **Specification is objected to because of the following informalities:**

Specification reads “the sub-channel signals are scaled and extended 610” (Page 14, line 28). Specification should read “the sub-channel signals are scaled and extended 670” or Fig. 6 should be amended to read "Block 610".

Specification reads “sub channel signals are color corrected 612” (Page 15, line 2). Specification should read “sub channel signals are color corrected 672” or Fig. 6 should be amended to read "Block 612".

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 1 -11 and 25 - 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant cites in claim 1 “each of the photo sensors converts incident light into **an output signal**”. Applicant cites “interpolate **the output signal** of one of the photosensors of one of the two color sub-channels using the output signal of another of the photosensors of another of the two color sub-channels”. The **output signal** is cited to be photoelectric value converted from the amount of incident light not an interpolated value of another of the photosensors of another of the two color sub-channels. Claims 2 - 11 and 25 – 28 are also rejected because the claims depend on a rejected claim.

***Claim Rejections - 35 USC § 103***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**7. Claims 1 - 3, 12 – 16, 25, 27 - 29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizukura (Japanese Patent application # 2003-284084) in view of Chapman (US Patent Pub. # 2004/0036788).**

As to claim 1, Mizukura (Fig. 9 and 18) teaches an image sensing device comprising:

- a plurality of photo sensors (B, G1, R, G2) arranged in at least one array (image sensor) (Para 53), such that each of the photo sensors (B, G1, R, G2) converts incident light into an output signal, the photo sensors (B, G1, R, G2) and their respective output signals being divided into a plurality of color channels (Para 53). Mizukura teaches an image sensor with a four color light filter formed over the front of the image sensor and the four chrominance signals are output to the front end. In paragraph 54 Mizukura teaches the front end provides processing to the image data.
- a filter (B, G1, R, G2) associated with each of the photo sensors, the filters (B, G1, R, G2) selecting light within predetermined spectral bands (drawing 18) for conversion by the photo sensors into the output signals (Para 53 and 54), one color channel (G green) indicative of one color and having an associated spectral bandwidth comprising at least two color sub-channels (G1 and G2) and the filters associated with the photo sensors of the at least two color sub-

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channels (G1 and G2) having spectral bands within the spectral bandwidth of the one color channel wherein one of the spectral bands is narrower (G2) in bandwidth than another (G1) of the spectral bands Para (99 – 101). Mizukura shows in drawing 18 that G1 has a spectral bandwidth of 425 – 625 nm and G2 has a spectral bandwidth of 495 – 535 nm. G2 is within the bandwidth of G1.

Mizukura teaches the picture signal is supplied to a signal processing part (71 of Drawing 12). The signal processing part (71 of drawing 13) performs an interpolation process. Interpolation process is well known in the art. Chapman reference teaches an apparatus for active pixel sensors designed to be self-repairing and methods for correcting defects in active pixel sensors in which pixels have failed (Para 2). Chapman (Fig. 5) teaches a circuitry coupled (Active pixel sensor (APS)) with the photosensors (photodiode P1) and configured to interpolate (use the functioning G subpixel) the output signal of one of the photosensors of one of the two color sub-channels (G1 or G2) using the output signal of another of the photosensors of another of the two color sub-channels (G1 or G2) (Para 118). Chapman teaches a defective G subpixel represents a special case, because it is assumed that each pixel 50 comprises two G subpixels 53, 54 (see FIG. 5A). Chapman teaches the output from both G subpixels is separately available (G1 and G2), then a failure in a particular G1 subpixel may be overcome by using only data from the functioning G2 subpixel (Para 118). Applicant's Fig. 6 teaches each of the broadband and narrowband green sub-channel signals are interpolated using the signal from the other green sub-channel. Chapman meets this

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limitation by using the functioning subpixel. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a the APS circuitry as taught by Chapman to the image processing device of Mizukura, to provide much greater resolution, relatively slow output and high power consumption, and easier to manufacture which lowers the system cost (Para 5 - 8 of Chapman).

As to claim 2, Mizukura teaches the image sensing device of claim 1 wherein the photo sensors (image sensor) are arranged in a single array and the filters (B, G1, R, G2) associated with each photo sensor (image sensor) are arranged in a mosaic of filters (B, G1, R, G2) located over the photo sensor array (image sensor) (Para 53).

As to claim 3, Mizukura teaches the image-sensing device of claim 2 wherein the mosaic of filters (B, G1, R, G2) is arranged in a Bayer pattern (Para 04).

As to claims 12, Mizukura teaches a method of capturing an electronic representation of an image comprising the steps of:

- projecting the image onto a sensor device (image sensor) comprising a plurality of photosensors (B, G1, R, G2), divided into a plurality of color channels (B, G1, R, G2); (Para 53). Mizukura teaches an image sensor with a four color light filter formed over the front of the image sensor and the four chrominance signals are output to the front end. In paragraph 54 Mizukura teaches the front end provides processing to the image data.
- restricting the wavelengths of light (B, G1, R, G2) incident on each photosensor to a spectral band (drawing 18) defining a color associated with the color channel of the respective photosensor (Para 53 and 54).

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- combining the outputs of the photosensors (RG1G2B signal) to generate the electronic representation of the image (Para 102 – 104). Mizukura teaches the linear matrix treating part (95) calculates an RG1G2B signal, and generates the RGB code for three colors. Examiner reads this to mean the G1 and G2 colors are combined to form the G for the RGB code for three colors.
- wherein one color channel (G) indicative of one color and having an associated spectral bandwidth is divided into at least two color sub-channels (G1 and G2) having filters associated with the photosensors of these at least two color sub-channels (G1 and G2), the filters (G1 and G2) having spectral bands within the spectral bandwidth of the one color channel wherein one of the spectral bands is narrower in bandwidth (G2) than another of the spectral bands (G1) within the spectral bandwidth of the one color channel (Para 99 – 103),

Mizukura does not teach combining the output of one of the photosensors of one of the at least two color sub-channels with the output of another of the photosensors of another of the at least two color sub-channels. Chapman reference teaches comprises combining the output of one of the photosensors of one of the at least two color sub-channels (G1) with the output of another of the photosensors of another of the at least two color sub-channels (G2) (Para 118). Chapman teaches the output from the two G subpixels may be combined (Para 118).



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As to claims 13 – 14, these claims differ from claims 2 – 3 only in that the claims 2 – 3 are apparatus claims whereas claims 13 – 14 are method. Thus method claims 13 – 14 are analyzed as previously discussed with respect to claims 2 – 3 above.

As to claim 15, Mizukura (Fig. 1 and 9) teaches the method of claim 14 wherein the mosaic of filter elements (B, G1, R, G2) comprises red (R), green (G) and blue (B) elements associated with red (R), green (G) and blue (B) color channels and the green color channel comprises two green sub-channels (G1 and G2) (Para 4, 53, and 54).

As to claim 16, Mizukura (Fig. 9) teaches the method of claim 15 wherein the Bayer pattern comprises alternating rows of filters a first of which includes red filters and green filters of the first green sub- channel and the second of which includes blue filters and green filters of the second green sub-channel (Para 53 and 54).

As to claim 25, Mizukura teaches wherein the circuitry (Active pixel sensor (APS)) is configured to interpolate (use the functioning G subpixel) the output signal of the one of the photosensors (G1 or G2) using only the output signal of the another of the photosensors (G1 or G2) (Para 118). Chapman teaches a defective G subpixel represents a special case, because it is assumed that each pixel 50 comprises two G subpixels 53, 54 (see FIG. 5A). Chapman teaches the output from both G subpixels is separately available (G1 and G2), then a failure in a particular G1 subpixel may be overcome by using only data from the functioning G2 subpixel (Para 118). Applicant's Fig. 6 teaches each of the broadband and narrowband green sub-channel signals are interpolated using the signal from the other green sub-channel. Chapman meets this limitation by using the functioning subpixel.

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As to claim 27, Mizukura teaches wherein the filters (R, G1, G2, and B) are configured to cause saturation of respective ones of the one and another photosensors responsive to reception of different amounts of the incident light of the one color by the respective ones of the one and another photosensors Para (99 – 101). Mizukura shows in drawing 18 that G1 has a spectral bandwidth of 425 – 625 nm and G2 has a spectral bandwidth of 495 – 535 nm. G2 is within the bandwidth of G1. Also G1 and G2 would respond differently to different amount of incident light because of the different in the spectral bandwidth. Depending on the color of the incident light the G2 filter could be saturated, but the G1 filter not be saturated.

As to claim 28, Mizukura teaches wherein the filters (R, G1, G2, and B) are configured to cause registration of the incident light of the one color above a noise floor by respective ones of the one and another photosensors responsive to reception of different amounts of the incident light of the one color by the respective ones of the one and another photosensors Para (99 – 101). Mizukura shows in drawing 18 that G1 has a spectral bandwidth of 425 – 625 nm and G2 has a spectral bandwidth of 495 – 535 nm. G2 is within the bandwidth of G1. As stated above one color (G2) could be above the noise floor and one of the another photosensors (G1) could be different. G1 and G2 have different spectral bandwidths as stated above.

As to claim 29, Mizukura teaches further comprising interpolating (interpolating process) the output of the one of the photosensors using only the output of the another of the photosensors (Para 59 and 65). Mizukura teaches an interpolation process to generate RGB signal for all photosensors.

As to claim 31, Chapman teaches wherein the combining the one (G1) and another outputs (G2) of the one and another photosensors produces a combined signal, and wherein the one (G1) and another outputs (G2) of the one and another photosensors are the only outputs combined to produce the combined signal (Para 118).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**9. Claims 4 – 6, 11, 17 – 19, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizukura (Japanese Patent application # 2003-284084) in view of Chapman (US Patent Pub. # 2004/0036788) and further in view of Roddy (US Patent Pub. # 20034/0160881).**

As to claim 4, note the discussion above. Mizukura in view of Chapman do not teach a beam splitter is provided which splits incident light into a plurality of paths and a separate filter/photo sensor array combination is located in each path. Roddy (Fig. 4) teaches the image-sensing device of claim 1 wherein a beam splitter (36 and dichroic mirror 32 and 34) is provided which splits incident light into a plurality of paths and a separate filter/photo sensor array combination is located in each path (30R, 30B, 30BG, 30G), there being a separate path and respective filter/photo sensor array combination

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provided for each color channel or sub-channel (Para 41). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a beam splitter and separate filter / photo sensor arrays as taught by Roddy to the image processing device of Mizukura in view of Chapman, to provide a camera which could provide a signal having a fourth color that would result in an improved color gamut (Para 16 of Roddy).

As to claim 5, Roddy teaches the image-sensing device of claim 1 wherein a beam splitter (36, 32, and 34) is provided which splits incident light into a plurality of paths and a separate filter/photo sensor array combination is located in each path, there being a separate path and respective filter / photo sensor array combination provided for each color channel, and whereby the at least one of the color channels that is further divided into a plurality of sub-channels (30BG, 30G) is represented by a single filter/photo sensor array combination wherein a filter associated with each photo sensor of the plurality of sub-channels is arranged in a mosaic of filters located over the photo sensor array (Para 41).

As to claim 6, Roddy teaches the image sensing device of claim 1 wherein the color channels comprise red (30R), green (30G) and blue (30B) color channels and the green color channel (30G) is divided into a plurality of sub-channels, a first one of which uses a first green filter type (30G) and a second of which uses a second green filter type (30BG) having a spectral band which is narrower in bandwidth than and overlapping with the spectral band of first green filter type (Para 41 and 43).

As to claim 11, Roddy teaches the image sensing device of claim 1 wherein the color channels comprise cyan, yellow, magenta and green color channels and the green channel is divided into a plurality of sub-channels, a first one of which uses a first green filter type and a second of which uses a second green filter type having a spectral band which is narrower in bandwidth than and overlapping with the spectral band of first green filter type (Para 49 and 50). The first green channel is made up of cyan and yellow and the second one is made from cyan. Roddy also states the array can be configured in different ways.

As to claims 17 – 19 and 24, these claims differ from claims 4 – 6 only in that the claims 4 – 6 are apparatus claims whereas claims 17 – 19 and 24 are method. Thus method claims 17 – 19 and 24 are analyzed as previously discussed with respect to claims 4 – 6 above.

**10. Claims 7 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizukura (Japanese Patent application # 2003-284084) in view of Chapman (US Patent Pub. # 2004/0036788) and further in view of Roddy (US Patent Pub. # 20034/0160881) as applied to claims 1 and 12 above, and further in view of Yang (US Patent # 5923380).**

As to claim 7, Mizukura in view of Chapman and further in view of Roddy teach the limitation “first green sub-channel”. Mizukura in view of Roddy do not teach the use of a Kodak™ Wratten™ #58 (green tricolor) filter. Yang teaches wherein the first green sub-channel uses a Kodak Wratten #58 (green tricolor) filter (Col. 7, line 23- 38).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a Kodak Wratten #58 (green tricolor) filter as taught by Yang to the “first green sub-channel” of Mizukura in view of Chapman and further in view of Roddy, because the use of a known filter color, such as a Kodak Wratten color filter, the spectral sensitivity of the CCD will be known (Col. 3, line 61 – Col. 4, line 10).

As to claim 20, this claim differs from claim 7 only in that the claim 7 is an apparatus claim whereas claim 20 is a method. Thus method claim 20 is analyzed as previously discussed with respect to claim 7 above.

**11. Claims 8 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizukura (Japanese Patent application # 2003-284084) in view of Chapman (US Patent Pub. # 2004/0036788) and further in view of Roddy (US Patent Pub. # 20034/0160881) and further in view of Yang (US Patent # 5923380) as applied to claims 7 and 21 above, and further in view of Kaplan (US Patent #6219140).**

As to claim 8, Mizukura in view of Chapman further in view of Roddy and further in view of Yang teaches the limitation “second green sub-channel”. Mizukura in view of Roddy and further in view of Yang does not teach the use of a Kodak Wratten #99 (green) filter. Kaplan teaches wherein the second green sub-channel uses a Kodak Wratten #99 (green) filter (Col. 4, line 42 – Col. 5, line 12). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a Kodak Wratten #99 (green) filter as taught by Kaplan to the “second

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green sub-channel” of Mizukura in view of Chapman further in view of Roddy and further in view of Yang, because the use of a known color filter, such as a Kodak Wratten color filter, the apparatus will be able to compensate for spectral fluctuations (Col. 2, line 44 – 48).

As to claim 21, this claim differs from claim 8 only in that the claim 8 is an apparatus claim whereas claim 21 is a method. Thus method claim 21 is analyzed as previously discussed with respect to claim 8 above.

**12. Claims 9, 10, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizukura (Japanese Patent application # 2003-284084) in view of Chapman (US Patent Pub. # 2004/0036788) and further in view of Roddy (US Patent Pub. # 20034/0160881) as applied to claims 6 and 19 above, and further in view of Gann (US Patent #7154545).**

As to claim 9, note the discussion of Mizukura in view of Chapman and further in view of Roddy above. Mizukura in view of Chapman and further in view of Roddy do not teach wherein the red channel is divided into a plurality of sub-channels. Gann (Fig. 2) teaches wherein the red channel (100 and 102) is divided into a plurality of sub-channels, a first one of which uses a first red filter type and a second of which uses a second red filter type having a spectral band which is narrower in bandwidth than and overlapping with the spectral band of the first red filter type (Col. 5, line 63 – Col. 6, line 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided wherein the red channel is divided into a

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plurality of sub-channels, a first one of which uses a first red filter type and a second of which uses a second red filter type having a spectral band which is narrower in bandwidth than and overlapping with the spectral band of the first red filter type as taught by Gann to the image processing device of Mizukura in view of Chapman and further in view of Roddy, because the additional spectral responses improve the spectral measurement accuracy, and increase the bit-depth, with little or no incremental cost, and with little or no negative impact on native input sampling rate or signal-to-noise (Col. 3, line 36 – 43).

As to claim 10, Gann teaches wherein the blue channel (108 and 110) is divided into a plurality of sub-channels, a first one of which uses a first blue filter type and a second of which uses a second blue filter type having a spectral band which is narrower in bandwidth than and overlapping with the spectral band of the first blue filter type (Col. 5, line 63 – Col. 6, line 3).

As to claims 22 and 23, these claims differ from claim 9 and 10 only in that the claim 9 and 10 are apparatus claims whereas claims 22 and 23 are method. Thus method claims 22 and 23 are analyzed as previously discussed with respect to claims 9 and 10 above.

**13. Claims 30, 26, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizukura (Japanese Patent application # 2003-284084) in view of Chapman (US Patent Pub. # 2004/0036788) and further in view of Kakarala (US Patent Pub. 2004/0032516).**



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As to claim 30, note the discussion above. Mizukura in view of Chapman do not teach the combined signal corresponding to one of five different output areas responsive to reception of the light of the one color by the one and another photosensors. Kakarala reference teaches a method for combining bad pixel correction and demosaicing in a single process is provided by interpolating sensor values for pixels immediately spatially adjacent to the current pixel being examined to detect defective pixels. As to claim 30, Kakarala (Fig. 3 and 7) teaches wherein the combining provides the combined signal corresponding to one of five different output areas responsive to reception of the light of the one color (R, G1, G2, B) by the one and another photosensors including:

- a first area wherein the outputs of the one and another photosensors (Step 520) are unregistrable below a noise floor (missing value) (Para 45).  
Kakarala teaches if a value is missing the median of the four surrounding sensor values are interpolated. Step 520 causes the method to repeat if another sensor is missing. Examiner reads this to mean a first sensor is missing interpolate with surrounding sensors. If a surrounding sensor is also missing interpolate the four surrounding sensors to find the missing value.
- a second area wherein only one of the outputs of the one and another photosensors (Step 520) is unregistrable below the noise floor (missing value). In this area the step 520 would be no and would proceed to step 530 (Para 45 – 46).

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- a third area wherein both of the outputs of the one and another photosensors (current pixel) are above the noise floor (lower limit 340 of Fig. 3) and below a saturation level (upper limit 335 of Fig. 3). In figure 3, Kakarala teaches if the current pixel is between the upper limit (335) and lower limit (340), the pixel is determined to be not defective (355).
- a fourth area wherein only one of the outputs of the one and another photosensors (current pixel) is below a saturation level (upper limit 335 of Fig. 3). In figure 3, Kakarala teaches if the current pixel is above the upper limit (335), the pixel is determined to be defective (345). Fig. 5 would determine the calculated value by taking the median of the surrounding sensors (Para 45 and 46).
- a fifth area wherein both of the outputs of the one and another photosensors (current pixel) are below the saturation level (upper limit 335 of Fig. 3). In figure 3, Kakarala teaches if the current pixel is between the upper limit (335) and lower limit (340), the pixel is determined to be not defective (355).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a method of determining a defective pixel as taught by Kakarala to the Image capture system of Mizukura, because the two processes (BPC and demosaicing) can be performed in a single stage. In addition, using interpolated values during BPC provides the additional advantage of identifying defective pixels near edges and in regions of texture, since both vertical and horizontal

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pixel neighbors nearest to the pixel being examined are used in the calculation of the interpolated values (Para 13 of Kakarala)

As to claim 26, Kakarala (Fig. 2) teaches wherein the circuitry (digital signal processor 40) is configured to interpolate (interpolate logic 100) the output signal (sensor value 30) prior to any color correction processing of the output signals (Para 31).

As to claim 32, Kakarala (Fig. 2) wherein the combining (interpolate) comprises combining (interpolate logic 100) prior to any color correction processing of the outputs (Para 31).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER K. PETERSON whose telephone number is (571)270-1704. The examiner can normally be reached on Monday - Friday 6:30 - 4:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tran Sinh can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. K. P./  
Examiner, Art Unit 2622  
8/20/2009

/Jason Chan/  
Supervisory Patent Examiner, Art Unit 2622